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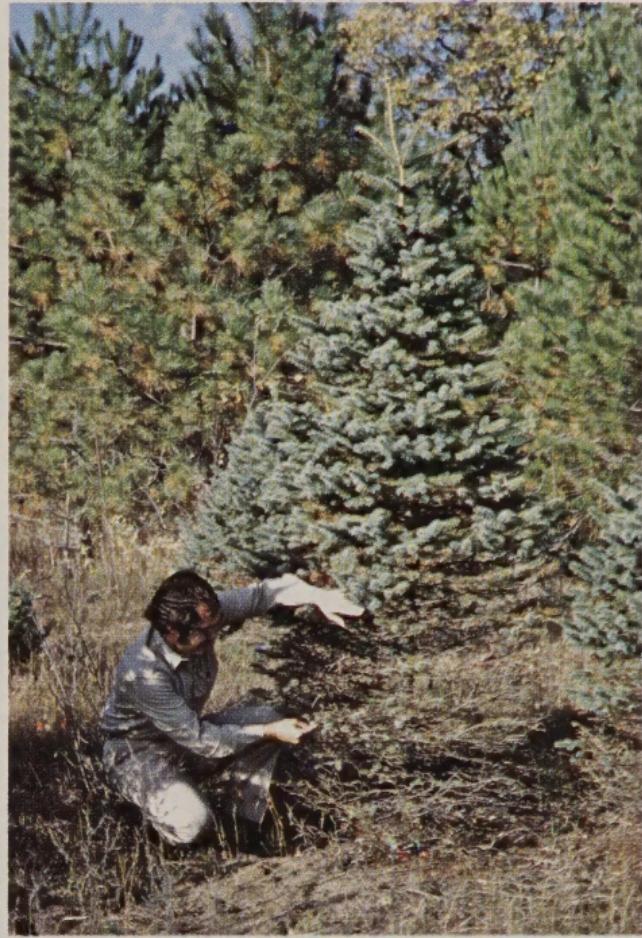
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Identify and Control Rhizosphaera Needlecast

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North Central Forest Experiment Station
Forest Service
U.S. Department of Agriculture

Rhizosphaera needlecast, caused by the fungus **Rhizosphaera kalkhoffii**, seriously damages blue spruce and occasionally white spruce in nurseries and Christmas tree plantations in the north-central States. Although some trees are killed, the primary damage has been premature needlecast, rendering the tree unmerchantable.

SYMPTOMS

Current-year needles are infected in May and June. Symptoms appear in late fall or the following spring, when fruiting bodies of the **Rhizosphaera** fungus appear in the stomata of infected needles. When magnified, these stomata appear as fuzzy black dots instead of the usual white color. The infected 2-year-old needles turn yellow in July and purplish-brown in late August. Most needles are cast in late summer, although some adhere overwinter and produce spores the following spring.



Fruiting bodies of Rhizosphaera kalkhoffii protruding from stomata appear as small black dots.



Infected needles eventually turn purplish-brown.

Rhizosphaera needlecast damage is most severe on lower portion of tree.



SPREAD

Hyaline conidia (spores $4 \times 8 \mu$ in size) are released from the fruiting bodies during wet weather in late spring. Rain-splash disseminates them to infect other needles. Ironically, spores may also be spread from tree to tree on the tools used to shear Christmas tree plantations, especially if shearing is done when foliage is wet. However, most infections in plantations result from infected planting stock.

CONTROL

Cultural

- Use healthy planting stock.
- Identify disease early to minimize losses.
- Discard seedlings that have fruiting bodies in the stomata.
- Shear trees in healthy plantations first.
- Sterilize tools by dipping in denatured alcohol for 3 minutes.
- Avoid shearing infected trees when foliage is wet.

Chemical

Apply a registered, preventive fungicide, such as Chlorothalonil, when new needles are half elongated and again when needles are fully elongated. Two years of treatment should permit most trees to develop full foliage; heavily infected trees may take longer. If treated early, *Rhizosphaera* can be controlled in 1 year.



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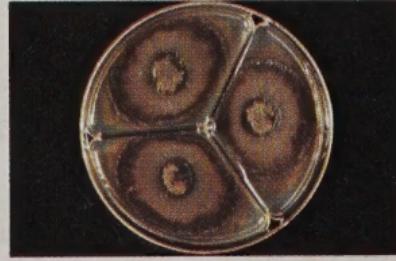
CULTURING

Sometimes the only sure way to identify this disease is to culture the causal fungus. Using normal, sterile isolation techniques, here is how to do it:

- Dip infected needles for 1 to 2 seconds in a 1:10 hypochlorite solution (household bleach and water) to sterilize the surface.
- Using a fine needle, remove portions of the fruiting body containing spores from the infected stomata.
- Place the fruiting bodies onto potato dextrose agar in petri dishes and incubate at 68°F for 5 to 10 days.

The mycelial culture is at first light tan in color. This gradually darkens in about 10 days to a yellowish brown. Advancing hyphae remain close to the agar surface and soon begin to produce abundant spores that bud off from any point along the hyphal cells.

Culture of Rhizosphaera.



(For further information on **Rhizosphaera** needlecast see:
Skilling, D.D., and T.H. Nicholls. 1974. **Rhizosphaera** needlecast.
American Christmas Tree Journal 18:21-23.)

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